

WHAT IS CLAIMED IS:

1. A semiconductor light-emitting device comprising:
a substrate provided with an n-type lower electrode on the back
surface;
a light-emitting layer provided on said substrate;
5 a p-type semiconductor layer provided on said light-emitting layer;
and
an upper electrode provided on said p-type semiconductor layer,
wherein
10 said upper electrode has a multilayer structure consisting of at least
two heterogeneous layers.
2. The semiconductor light-emitting device according to claim 1,
wherein said upper electrode includes an Au thin film coming into contact
with said p-type semiconductor layer and an n-type transparent conductor
film formed on said Au thin film.
3. The semiconductor light-emitting device according to claim 2,
wherein the thickness of said Au thin film is 1nm to 3 nm.
4. The semiconductor light-emitting device according to claim 2,
wherein said transparent conductor film is made of In_2O_3 -10 wt.% ZnO.
5. The semiconductor light-emitting device according to claim 1,
wherein said upper electrode has a multilayer structure including an upper
layer and a lower layer,
the surface of said upper layer is flattened, and
the surface of said upper layer is irregularized.
6. The semiconductor light-emitting device according to claim 1,
wherein said substrate includes a ZnSe single-crystalline substrate, and
said p-type semiconductor layer includes a ZnSe semiconductor layer,

a ZnTe semiconductor layer or a BeTe semiconductor layer.

7. The semiconductor light-emitting device according to claim 4,
wherein said transparent conductor film of In_2O_3 —10 wt.% ZnO is formed by
laser ablation.

8. A method of manufacturing a transparent conductor film
comprising steps of:

5 placing a substrate in a vacuum chamber;
centering a target serving as the material for a transparent
conductor film in said vacuum chamber;
introducing oxygen into said vacuum chamber; and
irradiating said target with a laser beam, depositing atoms or
molecular ions emitted by ablation on said substrate and crystal-growing
said atoms or molecular ions while oxidizing said atoms or molecular ions.

9. The method of manufacturing a transparent conductor film
according to claim 8, wherein said target contains In_2O_3 —10 wt.% ZnO.

10. The method of manufacturing a transparent conductor film
according to claim 9, performing said crystal growth while controlling the
film forming temperature in the range of the room temperature to 300°C.

11. The method of manufacturing a transparent conductor film
according to claim 8, performing said crystal growth while setting the film
forming pressure at 0.3 to 3×10^{-3} Torr.

12. A method of manufacturing a compound semiconductor light-
emitting device comprising steps of:

5 preparing a compound semiconductor light-emitting device substrate
immediately before formation of a transparent electrode;

placing said compound semiconductor light-emitting device substrate
in a vacuum chamber;

centering a target serving as the material for a transparent conductor film in said vacuum chamber;

10 introducing oxygen into said vacuum chamber; and irradiating said target with a laser beam, depositing atoms or molecular ions emitted by ablation on said compound semiconductor light-emitting device substrate and crystal-growing said transparent electrode while oxidizing said atoms or molecular ions.

13. The method of manufacturing a compound semiconductor light-emitting device according to claim 12, wherein said target contains In_2O_3 -10 wt.% ZnO .

14. The method of manufacturing a compound semiconductor light-emitting device according to claim 12, performing said crystal growth while setting the film forming temperature in the range of the room temperature to 300°C .

15. The method of manufacturing a compound semiconductor light-emitting device according to claim 12, performing said crystal growth while setting the film forming pressure at 0.3 to 3×10^{-3} Torr.

Add D>
add E3/
add E3/